Covenant of Mayors
in Sub-Saharan Africa

CoM SSA SEACAP Toolbox

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Publisher:
The Covenant of Mayors in Sub-Saharan Africa (CoM SSA)
c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

For more information contact: helpdesk@comssa.org
Publication date: November 2020
Author: ICLEI Africa
The full SEACAP Toolbox is found here: https://comssa.org/

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2.4: Analysis framework: the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)

This chapter is one component of the SEACAP Toolbox for the full Toolbox, please visit: https://comssa.org/

What you will learn in this chapter:

- Overview of the GPC framework
- The parameters for reporting using the GPC
- Sectors and scopes within a GPC-compliant inventory
- Determinants of data quality

This chapter has been designed for Local Government Officials and partners completing a SEACAP

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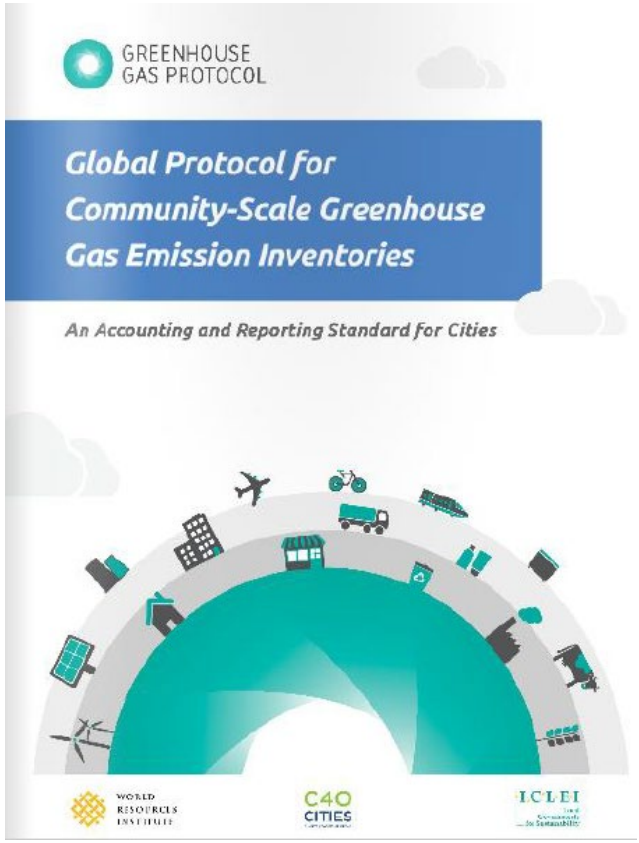
What is the GPC framework?



- The **G**lobal **P**rotocol for **C**ommunity-Scale Greenhouse Gas Emission Inventories (GPC) is an internationally recognized accounting and reporting standard for cities.
- Offers cities a robust, transparent and consistent framework to identify, calculate and report on city-wide GHG emissions.
- Developed by WRI, C40 Cities and ICLEI and tested by 35 cities. Published in 2014.

https://ghgprotocol.org/greenhouse-gas-protocol-accounting-reporting-standard-cities

Source: WRI, C40, ICLEI. Global Protocol for Community-Scale Greenhouse Gas Inventories

Why use the GPC?

- Offers developing countries an internationally accepted management tool to help local authorities to make informed decisions about climate change mitigation.
- Sets out requirements and guidance for calculating and reporting city-scale GHG inventories. It tells what to report but not how to calculate.
- Allows cities to have an exchange conversation and provide benchmarking to compare cities' progress across the world.
- Consistent with 2006 IPCC guidelines
- Specifically designed to be applicable to communities of all different sizes, from small villages to megacities.
- Cities making use of the GPC framework will be compliant with the mitigation pillar of the Joint Research Centre (JRC) guidebook for CoM SSA cities

Before and after the GPC?

Different types of measurements		 One measurement
Account for only a portion of emissions		 Consistently account for all emissions
Unable to relate to national climate action		 Can measure city's contribution to national climate efforts

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Process of developing a GPC compliant GHG emission inventory

- Define boundary
- Establish applicable sectors
- Categorize emissions by scope
- Reporting approach (BASIC / BASIC+)
- Calculate GHG emissions

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Inventory boundaries

Boundary	Definition	Example
Geographic area	Any geographic boundary	Steve Tshwete Local Municipality
Time period	Continuous period of 12 months	July 2017- June 2018
Greenhouse gases	Carbon dioxide (CO2); Methane (CH4); Nitrous oxide (N2O); Hydrofluorocarbons (HFC); Perfluorocarbons (PFC); Sulfurhexafluoride (SF6); Nitrogen trifluoride(NF3)	Carbon dioxide (CO2); Methane (CH4); Nitrous oxide (N2O)
GHG emission sources	Stationary energy; Transportation; Waste; Industrial processes and product use; Agriculture, forestry, and other land use	Stationary energy; Transportation; Waste

Allocate sectors

Sector	Description
Stationary Energy	Emissions from energy use in things that don't move
Transport	Emissions from energy use in things that do move
Waste	Emissions from things that decompose
IPPU (Industrial Processes &Product Use)	Emissions from the use of industrial products and chemical reactions / processes, e.g. hydrofluorocarbons being released by refrigerants; on-site emissions from the production of cement ; NOT emissions from electricity usage by industry
AFOLU (Agriculture, Forestry & Other Land Use)	Emissions from non-energy activities in agriculture, forestry and land use

Stationary Energy

Sub-sector	Description
Residential buildings	Emissions from energy use in households
Commercial and institutional buildings and facilities	Emissions from energy use in commercial buildings, and public buildings /facilities, e.g. schools, hospitals, government offices, highway street lighting, etc.
Manufacturing industries and construction	Emissions from energy use in industrial facilities and construction activities
Energy industries	Emissions from energy production and energy use in energy industries
Agriculture, forestry and fishing activities	Emissions from energy use in agriculture, forestry, and fishing activities
Non-specified	Remaining emissions from facilities producing or consuming energy not specified elsewhere
Fugitive emissions	Emissions from extraction, processing, storage and transport of fuel (coal, oil, gas) to the point of final use

Transport

Sub-sector	Description
On-road	Emissions from electric and fuel-powered cars, taxis, buses, etc.
Railways	Emissions from railway systems.
Waterborne navigation	Emissions from sightseeing ferries, international ships, etc.
Aviation	Emissions from helicopters, domestic inter-city flights, international flights, etc.
Off-road	Emissions from airport ground support vehicles

Waste

Sub-sector	Example
Solid waste disposal	Emissions from solid waste disposal in landfills or dump sites, including disposal in an unmanaged site, disposal in a managed dump or disposal in a sanitary landfill
Biological treatment	Emissions from biological treatment of solid waste
Incineration and open burning	Emissions from incineration and open burning of waste
Wastewater	Emission from wastewater treatment and discharge

IPPU (Industrial Processes & Product Use

Sub-sector	Example
Processes	Emissions from production and use of mineral products / chemicals / metals
Product use	Emissions from lubricants and paraffin waxes used in non-energy products, FC gases used in electronics production, and fluorinated gases used as substitutes for ozone-depleting substances

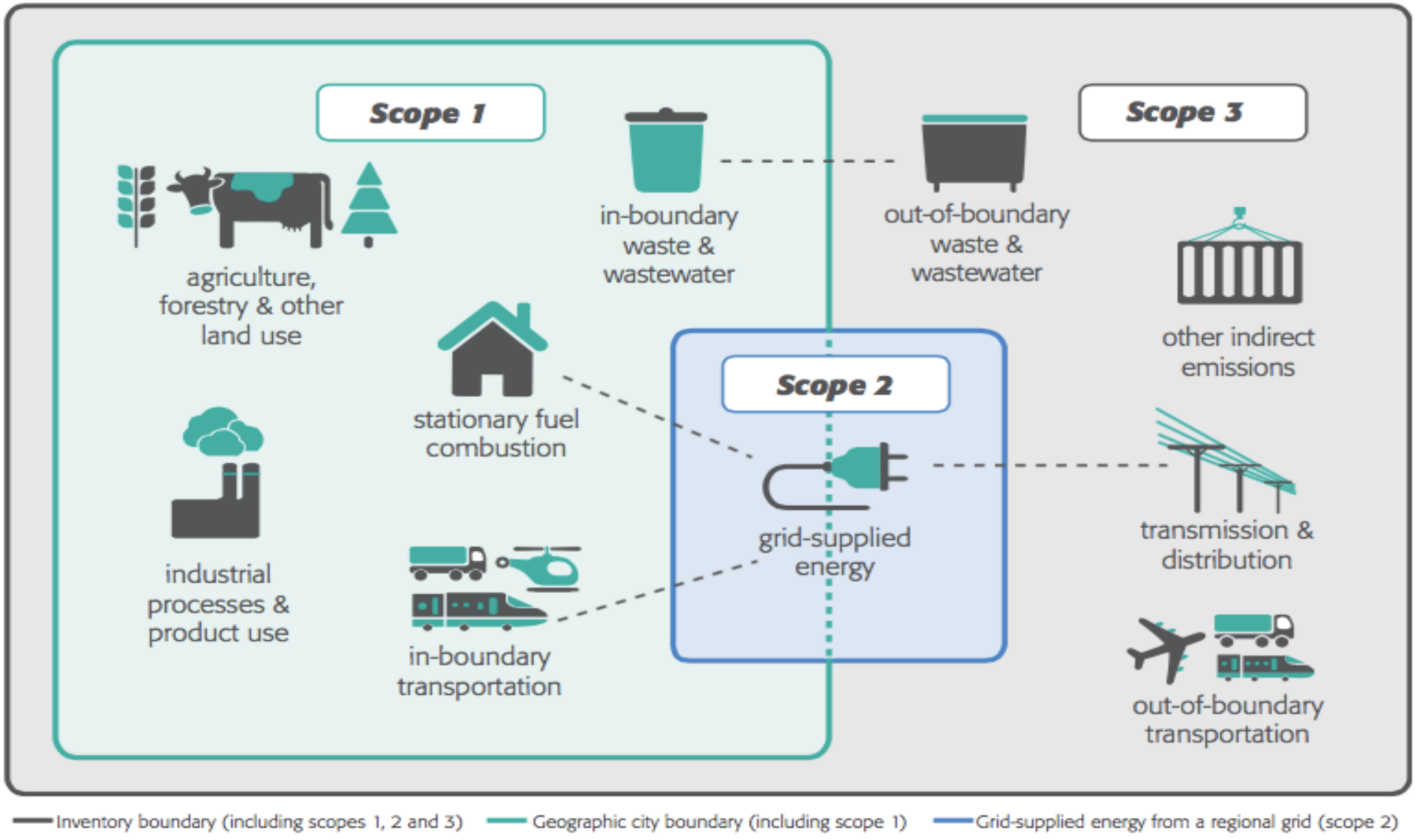
AFOLU

Sub-sector	Example
Livestock	Emissions from enteric fermentation or manure management of livestock
Land	Emissions or removal of emissions as a result of land use change
Aggregate sources	Emissions from biomass burning (for non-energy purposes), application of fertilisers to soil, rice cultivation, wood products harvesting, etc.

Categorize emission by scope (1/2)

Scope 1 Emissions	Scope 2 Emissions	Scope 3 Emissions
All GHG emissions from sources located within the boundary of the city (e.g. direct fuel use)	All GHG emissions from the use of grid-supplied electricity, stream, heating and/or cooling within the city boundary	All other GHG emissions that occur outside the city boundary as a result of activities within the city's boundary (e.g. landfill emissions, waste generated inside the city but disposed outside)

Categorize emission by scope (2/2)



Source: WRI, C40, ICLEI. Global Protocol for Community-Scale Greenhouse Gas Inventories

GHG emissions summary

Sector		Total by scope (tCO_2e)				Total by city-induced reporting level (tCO_2e)	
		Scope 1 (Territorial)	Scope 2	Scope 3 included in BASIC/ BASIC+	Other Scope 3	BASIC	BASIC+
Stationary Energy	Energy use (all I emissions except I.4.4)						
	Energy generation supplied to the grid (I.4.4)						
Transportation (all II emissions)							
Waste	Generated in the city (all III.X.1 and III.X.2).						
	Generated outside city (all III.X.3)						
IPPU (all IV emissions)							
AFOLU (all V emissions)							
Total		(All territorial emissions)				(All BASIC emissions)	(All BASIC & BASIC+ emissions)

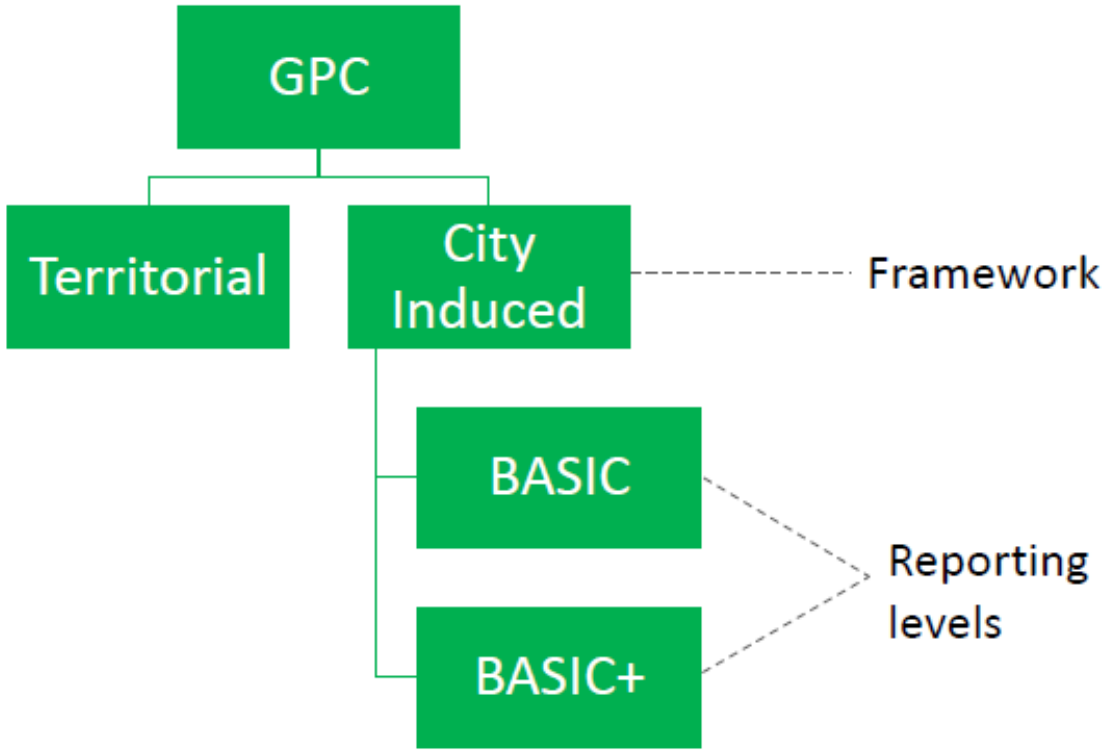
- Sources required for BASIC reporting
- + Sources required for BASIC+ reporting
- Sources included in Other Scope 3
- Sources required for territorial total but not for BASIC/BASIC+ reporting (*italics*)
- Non-applicable emissions

Source: WRI, C40, ICLEI. Global Protocol for Community-Scale Greenhouse Gas Inventories

Determine reporting framework

Framework

GPC uses two distinct but complementary approaches to adding up and reporting emissions:

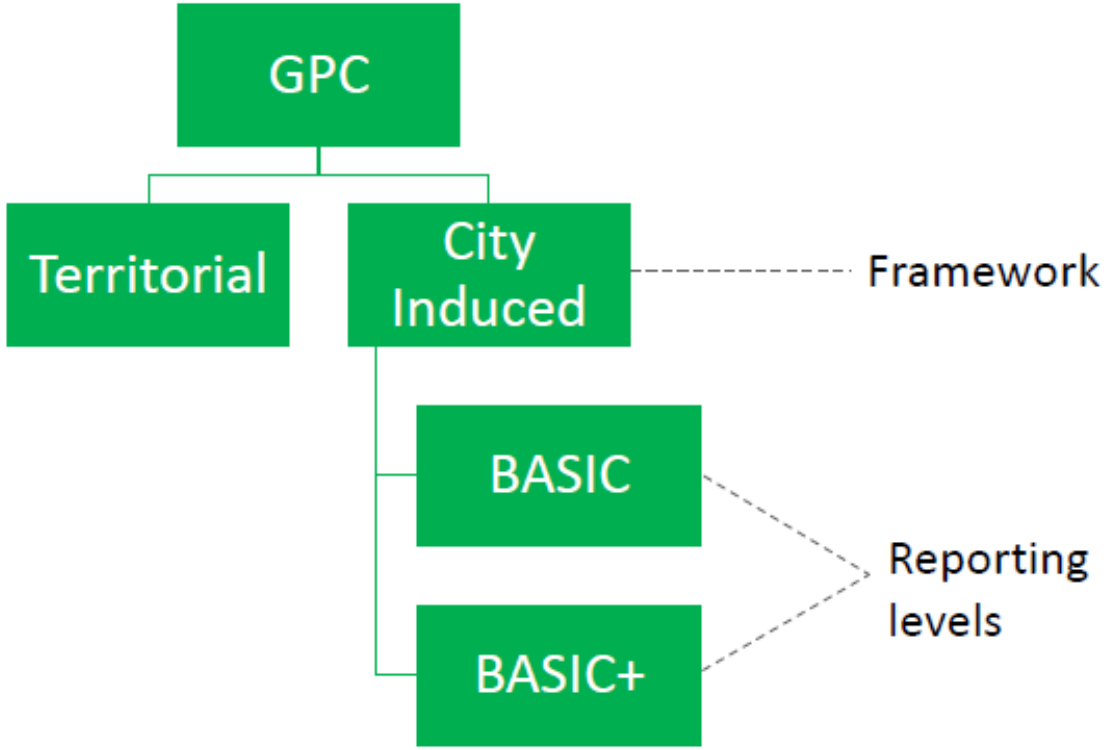


BASIC Territorial	BASIC+ City-induced
Emissions from all activities within the city boundary, whether caused by the city or not.	Emissions from all activities caused by the city, whether inside or outside the city boundary.

Determine reporting framework

Framework

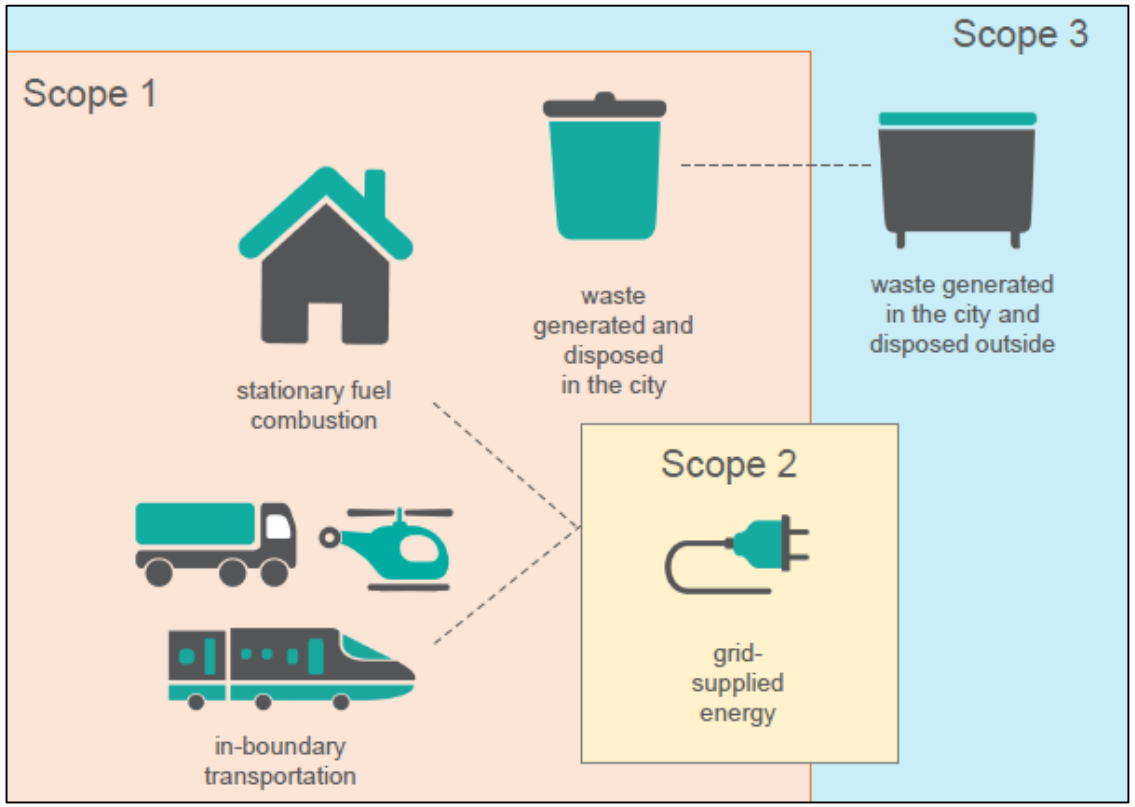
GPC uses two distinct but complementary approaches to adding up and reporting emissions:



BASIC	BASIC+
Requires the reporting of only some city-induced emissions (usually easier-to-find data).	Requires the reporting of all city-induced emissions.

JRC Guideline compliance

As the JRC Guideline asks for the boundaries for the entity to be the ‘geographical boundaries’ (p17) and the emission sources to include stationary energy, transportation, waste and energy supply (p18), a city-induced, BASIC framework is compliant with the JRC Guidelines.



Base Year and Reporting year:

- Assess which year has most data available, set as base year. Data from other years can still be used by ‘scaling’ the data.
- Reporting year may be no more than four years prior.
- Exception: cities reporting their inventories using the GPC for the first time, can use an reporting year as far back as six years prior to the year in which it is reported.

Calculating GHG EMISSIONS

Activity Data	X	Emission factors	=	GHG Emissions

Activity data (AD) quantifies the human activity occurring in the territory of the local authority

Emission factors (EF) quantifies the emissions of CO_2 emitted per unit of activity (IPCC, LCA, national/regional)

total amount of GHG emitted [tCO_2]

Examples of AD are :

- Charcoal for cooking;
- Electricity consumed;
- Diesel used in transportation;
- amount of waste sent to landfill,

It is strongly recommended to use **data relevant to the local territory**

Examples of EF are :

- CO_2 emitted per unit of charcoal;
- CO_2 emitted per unit of electricity;
- CO_2 emitted per unit of diesel;
- amount of CH4 emitted per tonne of waste sent to landfill,

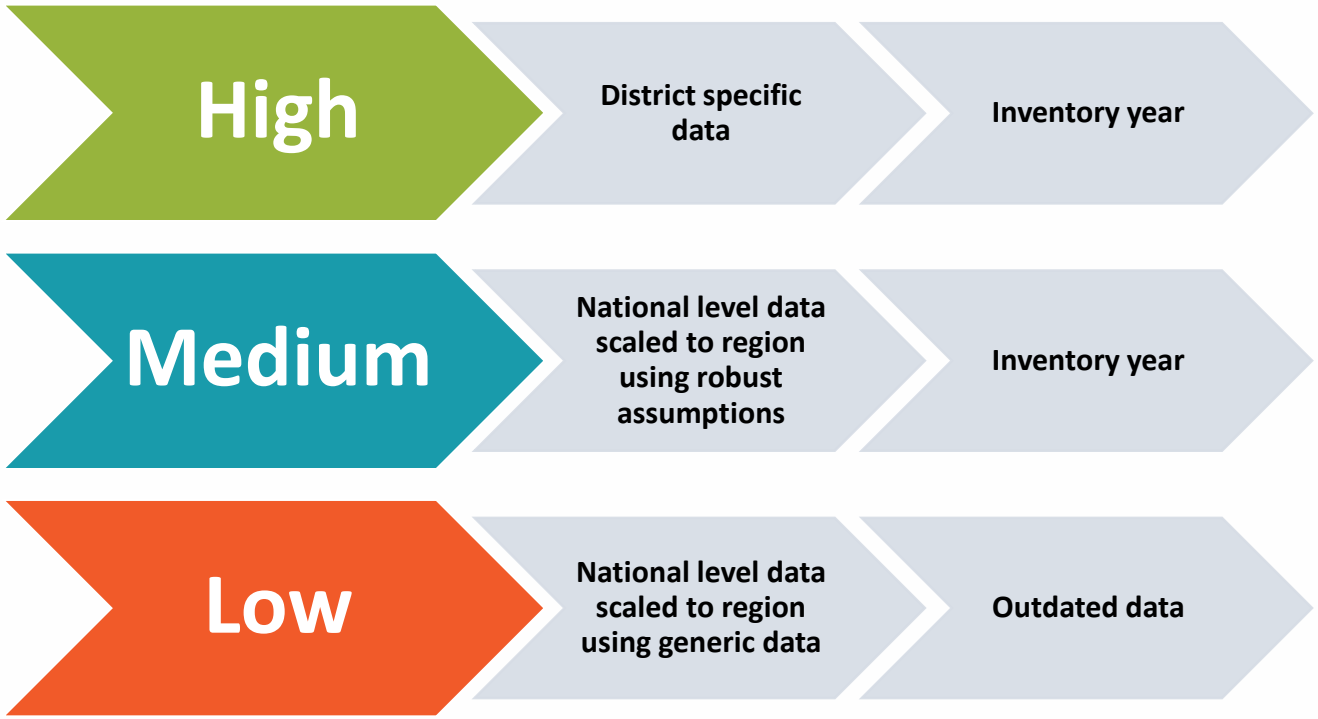
Total amount of GHG emissions:

- GHG emissions due to charcoal;
- GHG emissions due to electricity;
- GHG emissions due to diesel;
- GHG emissions due to waste production

INVENTORY: General principles for data quality

Rating system

- Quality of activity data
- High, Medium or Low



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The next chapter is Introduction to CIRIS, the GHG emissions inventory tool

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Author:
ICLEI Africa

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Publication date: November 2020
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CoM SSA programme is jointly implemented by:

Spanish Cooperation

AFD AGENCE FRANÇAISE DE DÉVELOPPEMENT

EXPERTISE FRANCE

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

CoM SSA programme is co-funded by:

European Union

german cooperation DEUTSCHE ZUSAMMENARBEIT

MINISTERIO DE ASUNTOS EXTERIORES, UNIÓN EUROPEA Y COOPERACIÓN

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Thank you

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